

Safety and Efficacy of Dietary Supplements Promoted for Weight Loss

There's No Free Lunch!

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Ingredients Commonly Found in Dietary Supplements Promoted for Weight Loss

- **Herbal laxatives**
(senna/cascara/aloe/rhubarb root)
- **Ephedra/Ma Huang**
- **Citrus aurantium/bitter orange**
- **Chromium Picolinate/Nicotinate**
- **Vanadyl Sulfate**
- ***Gymnema sylvestre***
- **Chitosan**



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Cost

Product	Days Supplied	Cost
• Super Dieter's Tea	15	\$4.09
• Metabolife 356 (ephedra, caffeine, chromium picolinate, ...)	5	\$11.99
• Dextatrim Natural (ephedra, chromium picolinate, vanadyl sulfate, ...)	15	\$7.85
• Sugar Blocker (chromium picolinate, vanadyl sulfate, Gymnema sylvestre)	30	\$15.99
• Chitosan	15	\$13.22

Format of Evaluations

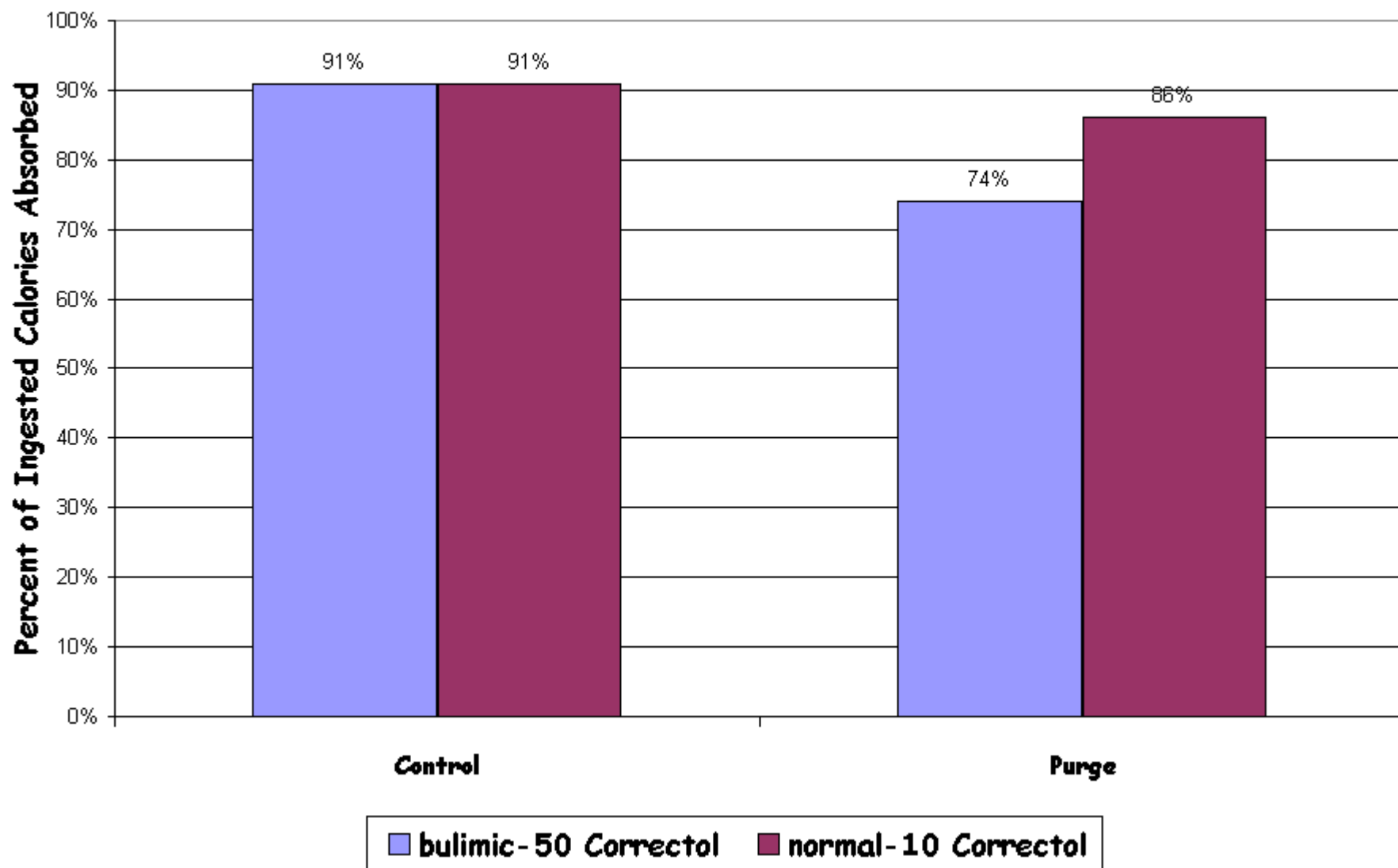
- **Mechanism of effect on weight loss**
- **Evidence supporting claimed effects**
- **Evidence contradicting claimed effects**
- **Potential adverse effects**

Herbal Laxatives

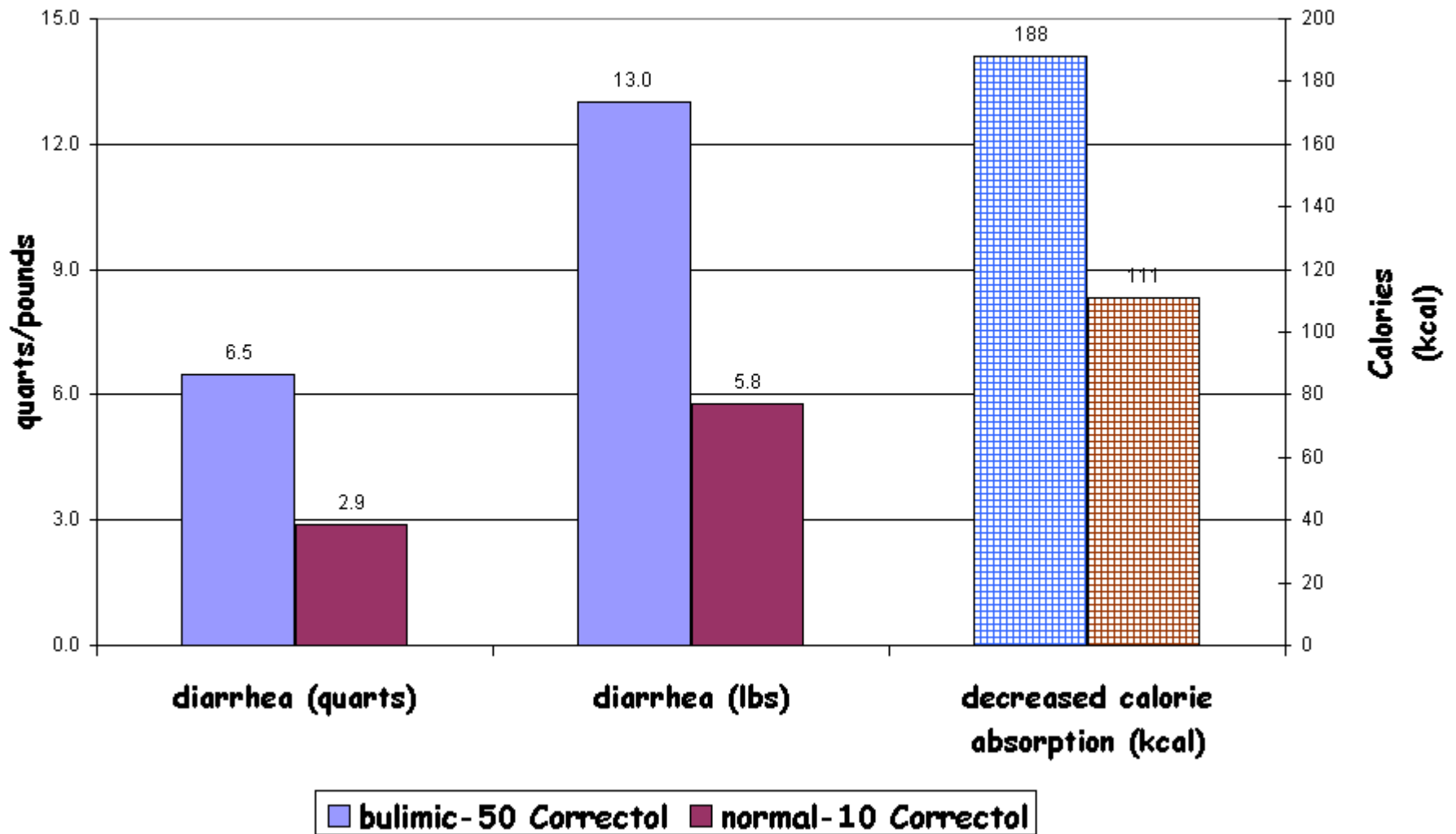
(Senna/Cascara/Aloe/Rhubarb Root)

- **Mechanism of effect on weight loss**
 - **Supposition: Laxative-induced diarrhea decreases the absorption of calories from GI tract**
 - **It Ain't Necessarily So**

Absorption of Food Calories With and Without Laxative Purge



Laxatives as Purgatives



Potential Adverse Effects

Herbal Laxatives

- **Dehydration/Electrolyte Imbalance**
 - **Low Blood Potassium Resulting In Irregular Heart Rhythm/Potentially Fatal**
 - **Loss Of Calcium In The Waste Stream Increasing The Risk Of Osteoporosis**

Ephedra/Ma Huang

- **Mechanism of effect on weight loss**
 - **Decreased appetite**
 - **Increased metabolic rate (5 to 10 %)**

Ephedra/Ma Huang

Boozer CN et al. 2002,

**Herbal ephedra/caffeine for weight loss *Int J
Obes Relat Metab Disord.* 26:593-604**

- **6-month placebo-controlled trial of Metabolife 356 ($\approx 50\%$ dropout)**
 - **8.4 pounds greater weight loss**
 - **Greater decrease in percent body fat (3.2 vs. 0.6%)**
 - **Persistent elevation in heartrate**

Potential Adverse Effects

Ephedra/Ma Huang

Metabolife 356

- **1998 - No consumer complaints**
- **2002 - 16,100 health-related consumer calls**
 - **3 Deaths**
 - **20 Heart attacks**
 - **24 Strokes**
- **Metabolife, We didn't lie**
- **No proof that product caused any illnesses**

Potential Adverse Effects

Ephedra/Ma Huang

**Haller and Benowitz,
New England Journal of Medicine Dec. 21, 2001**

- **140 reports of adverse reactions to ephedra supplements - FDA 1997-1999**
- **43 of 140 definitely or probably related to ephedra supplements**
- **44 of 140 possibly related to ephedra supplements**

Potential Adverse Effects

Ephedra/Ma Huang

Haller and Benowitz

- **87 cases definitely, probably, or possibly related to ephedra supplements**
 - **10 deaths, 10 strokes, 7 seizures**
 - **13 causing permanent impairment**
 - **9 in individuals taking less than the recommended daily dose and with no identified medical risk factors**

***Citrus aurantium*/Bitter Orange**

- **Mechanism of effect on weight loss**
 - **Contains synephrine/phenylephrine, a stimulant similar to ephedrine**
 - **Both stimulate the sympathetic nervous system, but in slightly different ways**

Citrus Aurantium/Bitter Orange /Synephrine/Phenylephrine

- **Evidence supporting/contradicting claimed effects**
 - **Little or no evidence for weight loss in peer-reviewed scientific literature**
 - **Not likely to increase metabolic rate**

Potential Adverse Effects

Citrus Aurantium/Bitter Orange

/Synephrine/Phenylephrine

- **Stroke from increased blood pressure**
- **Heart attack from narrowing the arteries supplying nutrients and oxygen to the heart muscle**
- **Interactions with prescription and over-the-counter drugs from inhibition of the principal drug metabolizing enzyme**

Chromium, Vanadium, Gymnema sylvestre

- **Mechanism of effect on weight loss**
 - **Improved glucose utilization in selected diabetics**
 - **Improved glucose utilization in animal models of diabetes**
- **Evidence contradicting claimed effects**
 - **No studies in the peer-reviewed scientific literature reporting effects of these compounds on weight loss**

Potential Adverse Effects

Chromium, Vanadium, Gymnema sylvestre

- **Concern that excess supplemental chromium may result in conversion of some chromium into carcinogenic form**
- **Picolinate can be toxic to liver and kidneys**
- **Could disrupt control of blood glucose in diabetics**

Chitosan

- **Mechanism of effect on weight loss**
 - **Supposition - binds to ingested fat in the gastrointestinal tract and prevents absorption**
- **Evidence supporting claimed effects**
 - **As shown on TV, Chitosan added to a beaker of oil and water combines with the oil and causes it to sink to the bottom of the beaker**

Chitosan

- **Evidence contradicting claimed effects**
 - **No change in fecal fat excretion in individuals taking \approx 1 gram of Chitosan three times per day with meals**
 - **No change in body weight or blood lipid levels in obese Asian subjects taking 1 gram of Chitosan three times per day with meals**
- **Potential adverse effects - nausea, allergy**

Conclusions

- **Laxative-induced purging does not produce a meaningful reduction in the absorption of food calories and can have serious consequences**
- **Products containing ephedra may have some effectiveness in promoting weight loss, BUT even when taken as directed, pose a real risk of adverse effects which can be disabling or fatal**

Conclusions

- **Products affecting glucose utilization in diabetics or animal models of diabetes (chromium, vanadyl sulfate, Gymnema sylvestre) do not produce weight loss in either diabetics or non-diabetics**
- **Products claiming to block absorption of glucose and fat from the gastrointestinal tract don't appear to work**

Recommendations

Use the money you would have spent on dietary supplements promoted for weight loss to buy your favorite fresh fruits and vegetables and enjoy some time exercising with friends.

Bibliography

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Ephedra

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- **Haller CA, Benowitz NL. 2000, Adverse cardiovascular and central nervous system events associated with dietary supplements containing ephedra alkaloids. *N Engl J Med.* 343:1833-8.**

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Citrus Aurantium/Bitter Orange /Synephrine/Phenylephrine

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Vanadium

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Gymnema sylvestre

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